

## ABSTRACT

Ultra high spectral efficient Feher Keying (FK) Modulation and Demodulation (Modem), Baseband Processing (BBP), Intermediate Frequency (IF) and Radio Frequency (RF) signal generation and processing methods and implementations, including Clock Modulated (CM) and Shaped Clocked (SC) Transmitters-Receivers (transceivers) are disclosed. Additional embodiments, including Feher Quadrature Shift Keying (FQPSK) and Feher Quadrature Modulation (FQAM), in conjunction with CM and SC are also described. In the FK modulator, specified clock converted and clock shaped signal parameters are generated. These are based on the input data signal patterns and are generated by means of control signals, which are designed in the data input signal interface data signal and/or clock signal encoder units. The selectable clock signal parameters include symmetrical and non-symmetrical clock signals, shaped band-limited continuous clock signal patterns, shaped encoded clock signals, variable rise and fall time clock signals, clock signals having adjustable on and off duration, multilevel and shaped clock signals and asynchronous clock signal information transmission means, where asynchronous clocking is referenced to the incoming data source signals. The FK processors are also used in conjunction with cross-correlated FQPSK quadrature and also non quadrature modem systems as input drive signals to FM VCO based systems to SSB to VSB to DSB-SC to QAM, and FQAM and to coded systems with adaptive equalized receivers, Non Redundant Error Correction (NEC), pseudo-error monitor systems. The FK systems and FT apparatus comprises entire transceiver structures including LIN (linear) and NLA (Non Linear Amplifier) transmitter receiver, AGC, synchronization and demodulation and post demodulation signal processors.